Generic Kernel Image - Progress

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Sandeep Patil
tl;dr

- Generic ARM64 kernel for all Android devices.
  - Many more details: https://lwn.net/Articles/771974/
- Reduce fragmentation
- Target Kernel: android-4.19 and android-mainline (android-5.4)
- First Target Hardware: Cuttlefish (x86, arm64), DB845c/ Hikey?
What, why, where ..

Branches
○ android-mainline
○ android-4.19
○ android-5.4*

Configuration
○ Single Kernel Configuration (gki_defconfig)
○ Suitable for all ARM64 based devices

Toolchain
○ Single Toolchain (Clang)
○ Hermetic Build

Scope
○ All ARM64 / x86_64* android devices
Workstreams

- ABI Monitoring
- Default kernel configurations
- Device dependencies
- Finalize user space APIs
  - SDCardFS, Ion
- Android changes
  - Kernel module loading
  - Split initramfs
ABI Monitoring and Enforcement

- Define a baseline ABI
- Keep it along with your sources
- Establish ABI checking (e.g. `build_abi.sh`) as mandatory test before merging
- Changes targeting Android Common Kernels have to pass this test in AOSP Gerrit

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```
-include/linux/utsname.h
+++

@@ -22,6 +22,7 @@ struct user_namespace;
 extern struct user_namespace init_user_ns;

 struct uts_namespace {
     int dummy;
     struct kref kref;
     struct new_utsname name;
     struct user_namespace *user_ns;
```
Defconfig

- Collection of ARM64 default configurations in ‘gki_defconfig’ in each kernel
- Problems
  - A lot of subsystem configs are only selected by other drivers
    - PINCTRL, REGMAP, DRM configs etc
  - Unnecessary Kconfig dependencies on CONFIG_ARCH_XXXX
Device dependencies

- Deferred probe works, but ...
  - Costs unacceptable delays during boot.
- Cyclic dependencies between devices
- Post boot device state clean up
Finalize UAPI

- Ion
  - Make heaps modular (we have to)
- SDCardFS
- lmkd
Android

- Modprobe support with dependency tracking
- Split ramfs
Contributions

- Linaro
  - Helping with AOSP dev boards running GKI
  - Upstream / Android changes, problems, questions
    - Email us at: kernel-team@android.com
Questions?